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APPLICATION NO. 09/692,007	FILING DATE 10/19/00	FIRST NAMED INVENTOR DEORNELLAS	ATTORNEY DOCKET NO. S TEGL1082US1
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EXAMINER UMEZ ERONINI, L

ART UNIT 1765	PAPER NUMBER 6
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DATE MAILED: 08/13/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application N .

09/692,007

Applicant(s)

DEORNELLAS ET AL.

Examiner

Lynette T. Umez-Eronini

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-- Th MAILING DATE of this communication appears on the cover sheet with th correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 and 11 is/are allowed.
- 6) ☒ Claim(s) 1-9 and 12-41 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

ment(s)

Office of References Cited (PTO-892)

Office of Draftsperson's Patent Drawing Review (PTO-948)

Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.

4) ☐ Interview Summary (PTO-413) Paper No(s). ____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1 and 13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant has fail to properly describe in the Specification and to show in the Drawings a second pattern being etched in a layer corresponding to the first patten.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

In claims 13; 22; 25; 26, 28; 29; 30; and 34, lines 1 and 2, "minimizing growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

In claims 25; 28; 29; 30; and 34, line 1, "features" is unclear in its meaning.

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Claim Rejections - 35 USC § 102/103

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 4-7, 9, and 35-41; 13-15, and 18; and 25-33 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoo (US 5,670,423).

Yoo teaches a method of controlling the critical dimension width of polysilicon (column 1, lines 1 and 2). The method comprises sputtering a titanium or titanium nitride (reactive metal) hard semiconductor mask **34B** directly overlying a polysilicon or polycide layer **16** and overlying a semiconductor substrate **10** (column 1, lines 29-37 and Figure **5A**); etching the hard mask layer **34** and polysilicon layer **16** that are not covered by the photoresist mask **36**, wherein the titanium hard mask **34** is wet or plasma etched (column 1, lines 50-55). Plasma etching the hard mask that lie over a semiconductor substrate

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suggests etching is carried out in a chamber, which reads on processing the work piece in a reactor using an etch step.

Using the same steps of Yoo as those of the claimed invention would inherently result in a method for minimizing critical dimension growth of the width features located on a work piece.

Claim Rejections - 35 USC § 103

7. Claims 3, 8, 12, 16, 17, 19, 20, 21, 23, 24, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoo (US 5,670,423) as applied to Claims 1, 13, and 30 above.

Yoo differs in failing to teach exposing the hard mask to a stream of oxidizing gas in claims 3, 8, 16, 17, 20, and 32.

It is well known in the art to etch Ti and TiN with a carbon and fluorine gas, such as CF₄, which is an oxidant.

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Yoo by using a conventional plasma such as fluorine to etch as well as oxidize the hard mask for the purpose of obtaining the best etched product.

Yoo differs in failing to specify processing parameters as recited in claims 11 and 23.

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It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to employ any of a variety of temperature variables including those claimed by the applicant. This is a well-known variable in the etching art, which is known to affect both the rate and quality of the etching process. The selection of a particular range of value would be optimized by conducting routine experimentation to obtain the best etched product.

Allowable Subject Matter

8. Claims 10 and 11 are allowed. Prior art lacks a teaching of providing energy to a reactor in order to increase a rate of oxidation of the hard mask in order to slow down the rate of erosion of the hard mask.

9. Claims 22 and 34 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is (703) 306-9074


FELISA HITESHEW
PRIMARY EXAMINER

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August 13, 2001